Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of

Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for Use by the Mobile-Satellite Service	)	ET Docket No. 95-18 RM-7927

To: The Commission

SUPPLEMENTAL COMMENTS OF COMSAT CORPORATION

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SUMMARY

At the 1995 World Radiocommunication Conference ("WRC-95"), 138 countries agreed to Final Acts that allocated spectrum at 2 GHz for use by the global Mobile Satellite Services ("MSS") beginning on January 1, 2000, and recognized that MSS and existing terrestrial Fixed Services ("FS") can share certain band segments at 2 GHz for a limited time as part of an overall transition plan for the 2 GHz band. As shown in our Supplemental Comments, the results of WRC-95 directly impact the issues under consideration in this rule making and must be considered by the Commission in formulating its decision. Indeed, COMSAT believes that the results of WRC-95 fundamentally alter the assumptions underlying the Commission's proposals for the deployment of MSS at 2 GHz in the United States, and support the adoption of COMSAT's alternative transition plan filed in this proceeding on May 5, 1995, as clarified herein.

COMSAT has previously shown that the Commission's proposals, which require that MSS operators relocate and fully reimburse all existing operators in the MSS uplink and downlink bands, are not necessary from a technical standpoint and impose an impossible economic burden on MSS. In contrast to the regulatory framework used to introduce new, personal communications services, for which spectrum was needed immediately in the U.S. and sharing with existing licensees was not feasible, a different approach is needed here since global MSS will only begin using spectrum in the year 2000, and sharing on the MSS downlink with existing terrestrial FS licensees is feasible for some period of time.

We believe that the results of WRC-95 provide a workable, alternative framework for the Commission to allocate spectrum at 2 GHz for domestic use by MSS and that the results support adoption of COMSAT's phased transition plan for the 2 GHz band.

In order to expedite resolution of this proceeding, we request that the FCC place our Supplemental Comments on public notice and seek comment from interested parties on our specific proposals for allocating the 2 GHz band to MSS consistent with the results of WRC-95. Adoption of COMSAT's phased transition plan, as summarized in Charts A-C of our Supplemental Comments, will enable the Commission to accomplish its objectives in this proceeding to facilitate the delivery of new, competitive, cost-effective MSS services at 2 GHz in the United States by the year 2000, while properly safeguarding the FS licensees' interests.

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To the Commission:

SUPPLEMENTAL COMMENTS OF COMSAT CORPORATION

COMSAT Corporation ("COMSAT"), through its COMSAT Mobile Communications business unit, hereby submits Supplemental Comments in response to the Commission's Notice of Proposed Rule Making ("NPRM")[1] in the above-captioned proceeding.

The purpose of these Supplemental Comments is to request that the FCC incorporate the results of the 1995 World Radiocommunications Conference ("WRC-95") into its proposals in this proceeding. The WRC-95 Final Acts[2] provide for the early implementation of global Mobile Satellite Services ("MSS") at 2 GHz by January 1, 2000, and for the gradual transition of terrestrial Fixed Services ("FS") from the 2 GHz band. To accomplish these goals, the WRC-95 Final Acts recognize as a fundamental principle that MSS and existing FS microwave systems can share certain band segments at 2 GHz for a limited time as part of an overall transition plan for the 2 GHz band and that interference criteria has been devised, in accordance with

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[1] Notice of Proposed Rule Making, ET Docket No. 95-18, 10 FCC Rcd 3230 (1995) ("NPRM").

[2] Final Acts of the World Radiocommunication Conference (WRC-95) (Parts I & II), Geneva, 1995 ("WRC-95 Final Acts").

internationally agreed FS performance objectives, to protect existing FS microwave systems during the transition and ensure the timely deployment of MSS systems at 2 GHz.

We believe that the results of WRC-95 provide a workable framework for the Commission to allocate spectrum at 2 GHz for use by MSS in the United States and that this framework is consistent with COMSAT's phased transition plan, as submitted in this proceeding on May 5, 1995,[3] and clarified herein. COMSAT's Supplemental Comments propose specific steps for the FCC to implement the results of WRC-95 which we believe will facilitate the introduction of global MSS services at 2 GHz to the American public. We are mindful that issues involved here are complex and that the Commission is eager to reach a decision in this proceeding. Accordingly, to expedite resolution of these matters, while assuring development of a full and accurate record, we request that the FCC place our Supplemental Comments on public notice and seek comment from interested parties on our proposals for allocating the 2 GHz band to MSS consistent with the results of WRC-95.

I. BACKGROUND

In our Comments and Reply Comments filed earlier in this proceeding, COMSAT has strongly supported the objectives of the Commission's NPRM to allocate spectrum in the United States at 2 GHz for global MSS. However, COMSAT and other MSS interests

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[3] See Comments of COMSAT Corporation, filed May 5, 1995, at 17-24 ("COMSAT Comments").

have expressed grave concern regarding the FCC's band clearing proposal which requires MSS operators to relocate, and fully reimburse, existing U.S. terrestrial FS operators in both the MSS uplink (1990-2025 MHz) and downlink (2165-2200 MHz) bands.[4]

We estimate that the terrestrial relocation costs in the United States alone, for both the MSS uplink and downlink band, could reach $3.0 billion -- an amount that could not be justified, even under the most optimistic MSS business plan. Indeed, if the FCC adopts an Order consistent with its proposal it would effectively prohibit the implementation of new MSS technology in the 2 GHz bands. Such a result would not only deprive users of new services, but would limit competition in the market for global mobile personal satellite communications.

COMSAT also has demonstrated that relocation of terrestrial facilities is not required to achieve the Commission's objectives. Technical interference studies conducted by COMSAT,[5] and other studies performed within the ITU-R,[6] show that for some period of time MSS can share the downlink band at 2160-2200 MHz without causing harmful degradations to the quality of existing FS operations in the 2 GHz band. As an alternative to the FCC's band clearing proposal, COMSAT submitted a phased transition plan

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[4] COMSAT Comments at 10-17; Reply of COMSAT Corporation, filed June 21, 1995, at 4-17 ("COMSAT Reply").

[5] COMSAT Comments at Appendix II.

[6] See ITU-R Doc. 2-2/TEMP/94(Rev.1)-E; ITU-R "CPM Report on technical, operational and regulatory/procedural matters to be considered by the 1995 World Radiocommunication Conference," Geneva, 1995 ("WRC-95 CPM Report").

based on the premise that MSS can share downlink spectrum with existing FS facilities while a gradual transition plan is implemented; and that MSS uplinks can be accommodated in the 1990-2025 MHz band through a two-phase rechannelization of the seven Broadcast Auxiliary Service ("BAS") channels currently operating in the 1990-2110 MHz band.

COMSAT has held several discussions with FS industry representatives in an effort to clarify the technical issues surrounding our proposal. Our objective in these discussions has been to identify the practical interference criteria applicable to MSS/FS sharing situations in the United States to ensure that the criteria are realistic in the context of applicable ITU-R FS performance objectives and that they are acceptable to the domestic FS industry.[7] While COMSAT plans to continue these discussions, we believe that the WRC-95 Final Acts have actually specified the process for coordinating MSS and FS operations at 2 GHz for all affected ITU Administrations and, thus, the FCC should address the issue in the record of this proceeding.

II. THE WRC-95 FINAL ACTS PROVIDE A FRAMEWORK FOR GRADUAL TRANSITION AT 2 GHZ CONSISTENT WITH COMSAT'S ALTERNATIVE PLAN IN THIS PROCEEDING

At WRC-95 the conferees from 138 countries agreed to Final Acts that provide for the early implementation of global MSS systems at 2 GHz by year 2000 on a co-primary basis with existing

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[7] See COMSAT Letter to John Reardon, ET Docket No. 95-18, November 13, 1995.

FS operations.[8] The Final Acts call for the gradual transfer of FS operations from the overlapping portions of the 2 GHz MSS band and request that Administrations take certain steps to implement the transition in a timely and effective manner.[9] It is COMSAT's contention that these results should form the basis for the FCC's decisions in this proceeding and, as such, support the adoption of COMSAT's alternative plan for a two-phased, gradual introduction of MSS systems at 2 GHz.

A. 2 GHz MSS Allocations and Global Dates of Access

The WRC-95 Final Acts include provisions to make MSS available on January 1, 2000 for worldwide service with primary allocation in the core 2 GHz bands at 1990-2010 MHz (Earth-to-space) and 2170-2200 MHz (space-to-Earth).[10] The WARC-92 MSS band at 1980-1990 MHz also will be available for MSS uplinks in the year 2000 in ITU Regions 1 and 3.[11] In addition, new MSS allocations at 2010-2025 MHz (uplink) and 2160-2170 MHz (downlink) will be available for use in the United States (and

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[8] WRC-95 Final Acts (Part I), International Table of Frequency Allocations, at 135.

[9] See WRC-95 Final Acts (Part II), Res. COM 5-10, Resolves 4.1 & 4.3. A copy of Resolution COM 5-10 is attached hereto as Attachment 1.

[10] WRC-95 Final Acts (Part I), Footnote S5.389A, at 136.

[11] Id. The 1980-1990 MHz band will not become available in Region 2 until the year 2005. However, because of the FCC's prior allocation of the 1970-1990 MHz band to terrestrial PCS, the 1980-1990 MHz band may never become available for MSS uplinks in the United States. See PCS Reconsideration Order, GEN Docket No. 990-314, 9 FCC Rcd 6908 (1994).

Canada) on January 1, 2000.[12]

Before WRC-95, there were actually two different dates of access for the core 2 GHz MSS bands at 1980-2010/2170-2200 MHz. While these bands were to be available in the United States on January 1, 1996, MSS did not have full access to these bands on a worldwide basis until January 1, 2005.[13] This situation changed at WRC-95 where the world agreed to a common date of January 1, 2000, upon which MSS may access the core 2 GHz bands on a primary basis with FS facilities. The new date of access gives the United States and other countries time to implement the necessary transition arrangements. However, as we indicated in our Comments, a clear plan of action must be articulated now if the bands are to become usable for MSS by the year 2000. Implementation plans also need to be developed to make use of the new MSS band extensions for ITU Region 2 at 2010-2025 MHz and 2160-2170 MHz, which become available in the U.S. in year 2000.

WRC-95's success in advancing the global date of access for the 2 GHz MSS bands, and in securing additional new MSS service allocations in Region 2, reflects a substantial evolution in the world view since WARC-92 concerning the feasibility of MSS/FS band sharing. At WARC-92, in the absence of detailed sharing

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[12] WRC-95 Final Acts (Part I), Footnote S5.389D, at 136. Within Region 2, additional spectrum is to become available for MSS in the year 2005 in the bands 2010-2025 MHz (uplink) and 2160-2170 MHz (downlink). See id. (Footnote S5.389C).

[13] Final Acts of the World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum (WARC-92), Malaga-Torremolinos, 1992 ("WARC-92 Final Acts").

studies, many countries strongly opposed MSS operations in the 2 GHz bands before the year 2005. They believed that FS and MSS were mutually exclusive services; and, as such, that no workable transition plan could be developed that would be acceptable to both MSS and FS interests. Since 1992 these attitudes have changed significantly as a result of the work within the ITU-R and among the ITU member countries to address MSS/FS sharing and transition issues.[14] With the conclusion of WRC-95, a majority of countries are now convinced that sharing between MSS and existing FS systems at 2 GHz is feasible as part of a gradual transition arrangement.

These two concepts -- band sharing (in the short-to-medium term) and a gradual transition of FS to other spectrum -- lie at the heart of COMSAT's phased transition plan for the 2 GHz MSS downlink band. We have proposed that non-geostationary ("NGSO") MSS systems, such as ICO, share the downlink band with existing FS systems in the United States while the transition of FS stations is implemented. We have requested that the FCC not license new FS facilities in the 2 GHz MSS downlink band and have called on the FCC to devise an orderly transition plan to clear existing FS operations over time from the portion of the 2 GHz band which overlaps with the WRC-95 MSS allocations. We recognize that the technical issues surrounding our proposal are

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[14] See, e.g., WRC-95 CPM Report at 27 (concluding based on the studies undertaken in the ITU-R involving the 2160-2200 MHz band that "sharing between non-GSO/MSS (space-to-Earth) systems and the FS should be feasible.").

complex, but we believe that the WRC-95 Final Acts, and relevant ITU-R studies and Recommendations, provide the methodology for the FCC to implement MSS systems at 2 GHz consistent with our phased transition plan and in a manner that should be acceptable to both MSS and FS interests.

B. Resolution COM 5-10

Resolution COM 5-10 reflects the consensus of the WRC-95 Conferees to provide for the "gradual transfer" of FS assignments in the MSS uplink and downlink bands at 2 GHz.[15] It identifies the steps to transition the use of the 2 GHz bands in a manner that balances and protects the interests of both MSS and FS operators. The clear intent of the Resolution is that it is feasible to share spectrum in the 2 GHz MSS downlink bands in the near term and to implement a gradual transition of FS systems over the long term to non-overlapping portions of the 2 GHz bands.

The concept of a gradual transfer of FS facilities from the 2 GHz band is consistent with COMSAT's alternative proposal which contemplates that the Commission proceed in several phases to make sufficient, usable spectrum at 2 GHz available to global MSS systems.[16] As discussed in Section III *infra,* we propose that the FCC take certain steps to ensure that existing BAS operations in the MSS uplink are cleared from the 1990-2025 MHz band in two

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[15] WRC-95 Final Acts (Part II), Res. COM 5-10, Resolves 4.3.

[16] See COMSAT Comments at 17-24.

phases between years 2000-2005, and that existing FS operations in the MSS downlink band at 2160-2200 MHz would coordinate sharing and transition arrangements with MSS, consistent with the results of WRC-95, for shared use of the band by FS and MSS until year 2005.

In order to successfully implement the gradual transition of FS systems at 2 GHz, Resolution COM 5-10 instructs Administrations to undertake certain actions. Administrations are requested to notify to the ITU Radiocommunication Bureau ("BR") the basic characteristics of the frequency assignments to existing or planned fixed stations requiring protection and brought into use before year 2000.[17] This information facilitates the sharing and transition arrangements between MSS and FS systems in the MSS downlink band and is useful in conducting the coordination process.

Administrations also are requested to ensure that there is no unacceptable interference to FS systems notified and brought into use by year 2000.[18] To assist in implementing this provision, the Conference directed the ITU-R and the BR, to develop the system specific methodology to assess the impact of interference to FS systems in the detailed coordination of MSS systems.[19] These provisions reflect the fundamental concept that

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[17] WRC-95 Final Acts (Part II), Res. COM 5-10, Resolves 1.

[18] WRC-95 Final Acts (Part II), Res. COM 5-10, Resolves 3.

[19] WARC-92 Final Acts, Res. 46 (as modified by WRC-95); Recommendation ITU-R IS.1143.

sharing between MSS and FS systems is possible with appropriate, detailed inter-system coordination to protect existing FS systems.

During the transition period, it is expected that Administrations will relocate their FS operations to bands that do not overlap with MSS allocations.[20] Such transition is necessary as MSS networks mature and increase their traffic loads, making it more difficult to share spectrum with FS and to implement interference avoidance strategies. For this reason, Resolution COM 5-10 provides that new FS systems brought into operation after January 1, 2000, should not overlap with the 2 GHz MSS allocations implemented by that date.[21] This provision is consistent with the U.S. proposal to WRC-95.[22] It is also consistent with COMSAT's view. In our Reply Comments we urged the FCC, upon the adoption of an Order in this proceeding, to

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[20] See WRC-95 Final Acts (Part II), Res. COM 5-10, Resolves 4.1.

[21] WRC-95 Final Acts (Part II), Res. COM 5-10, Resolves 4.1. Resolution COM 5-10 recommends that countries follow the channel plans of Recommendation ITU-R F.1098. To assist those Administrations considering a replanning of their terrestrial fixed networks in the 2 GHz range the ITU-R and the BR are to develop the necessary planning tools as soon as possible. Id. at Requests 1.2.

[22] See Conference Doc. 148, U.S. Proposals for the Work of the Conference, Nov. 2, 1995 (proposing on behalf of the United States that "Administrations shall ensure that new Fixed Service systems (that have been approved by the National Administration after the last day of WRC-95) should be designed so as to avoid overlap of the spectrum used by Fixed Service with Mobile Satellite Service in either the Earth-to-space or space-to-Earth portions of these global Mobile Satellite Service bands as in Recommendation ITU-R F.1098 or in other Fixed Service channel plans.").

immediately impose a freeze on issuing new licenses to terrestrial BAS and FS systems operating in the 2 GHz MSS uplink and downlink bands, respectively, so as to reduce the number of FS operations that would need to be cleared from these bands over time.[23]

In sum, the gradual transition framework agreed to in Resolution COM 5-10 is consistent with COMSAT's phased transition plan and ensures that Administrations can implement MSS service on a timely basis by the year 2000 without causing harmful interference, or disruption, to the fixed operations in the affected bands.

III. PROPOSED ACTIONS TO INCORPORATE THE RESULTS OF WRC-95 INTO THIS PROCEEDING

COMSAT requests that the FCC place COMSAT's Supplemental Comments on public notice and seek comments from interested parties regarding our analysis of the results of WRC-95, discussed in Section II *supra*, and the proposals set forth below for incorporating the results of WRC-95 into this proceeding. Based on our analysis of the results of WRC-95, COMSAT believes that the FCC can, and should, adopt an Order in this proceeding which provides for a gradual transition of MSS and FS facilities in the 2 GHz band consistent with COMSAT's phased transition plan. Accordingly, we urge the FCC to make the following specific findings in this proceeding to facilitate the introduction of global MSS at 2 GHz in the United States.

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[23] COMSAT Reply at 7-10.

A. The FCC Should Implement a Gradual Transition in the 2 GHz Band Rather Than an Immediate Relocation of FS Facilities

As described in Section II, the results of WRC-95 establish that MSS and existing FS facilities can share certain band segments at 2 GHz and that interference criteria, consistent with internationally agreed to ITU-R FS performance objectives, can be devised to reasonably protect existing FS microwave systems and provide for their gradual transfer out of the MSS downlink band. Given the decisions at WRC-95, the Commission's proposal to immediately clear all FS operations from the portions of the 2 GHz band overlapping with MSS -- in a move paid for by the MSS licensees -- is unnecessary and would impose an impossible economic burden on the MSS industry which is very likely to jeopardize the delivery of a valuable, competitive service to the public.

Adoption of a gradual transition plan for FS systems overlapping with MSS operations in the 2 GHz band would allow FS operators to amortize their existing investments and plan appropriately for future system growth, thereby spreading the costs of the FS relocation over an extended period of time. Existing FS facilities can continue to operate until they are replaced with new equipment operating in a different band, or a non-overlapping portion of the 2 GHz band, under a schedule to be adopted by the Commission.[24] Accordingly, such a plan would not

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[24] COMSAT is proposing that the existing BAS and FS operators transition out of the 2 GHz MSS bands in two phases before January 1, 2005. See Chart A, attached hereto.

place an undue financial burden on the FS operators which, consistent with the WRC-95 Final Acts, must eventually move out of the 2 GHz MSS downlink band.

A gradual transition also does not unduly burden MSS operators. In contrast to the FCC's proposal in this proceeding, Resolution COM 5-10 contains no requirement for a wholesale relocation of FS operations, or expectation that such relocation be funded by MSS operators. While such a plan may be appropriate in the context of PCS -- in which spectrum sharing arrangements are not possible and there is an urgent need to clear the FS bands quickly to accommodate many, new local PCS providers -- this is not the situation with MSS. As we have demonstrated, MSS can share spectrum with FS downlinks for some time and, in all likelihood, there may not be more than two or three MSS operators licensed at 2 GHz by the year 2000 which, under COMSAT's proposal, would then have to coordinate with existing FS operators throughout the United States and in other countries around the world to accommodate MSS operations at 2 GHz.

The estimated cost of $3.0 billion for MSS to relocate terrestrial FS and BAS operations in the 2 GHz bands in the United States is, by itself, a prohibitive burden that prospective MSS operators cannot undertake. If these same MSS operators were required to pay for similar terrestrial relocations around the world, the magnitude of the relocation cost would be multiplied many fold. Such global relocation of terrestrial facilities by a relatively few MSS operators at 2 GHz

is unrealistic and has not, and should not, be considered at the international level.

It is appropriate that the Commission, in considering the results of WRC-95 in this proceeding, take note of the substantial change in the world view regarding the use of the 2 GHz band and modify its proposals as necessary, consistent with the WRC-95 Final Acts. Accordingly, we propose that the FCC proceed to implement a gradual transition plan for existing 2 GHz FS facilities which will deal fairly with the interests of the FS licensees and ensure that the 2 GHz bands become usable for MSS by the year 2000.

B. COMSAT's Phased Transition Plan Outlining the Steps to Effectuate the Transition Should be Adopted in the U.S.

We propose that COMSAT's alternative plan, as clarified herein, serve as the vehicle to implement 2 GHz MSS services in the United States and to transition FS facilities from overlapping portions of the 2 GHz band. COMSAT originally proposed that the Commission undertake two separate allocations for the 2 GHz MSS bands: that the FCC first allocate the core 2 GHz MSS bands and make them usable by MSS in 1998; then, as a second phase, allocate the MSS extension bands and make them usable for MSS by 2005. Given the changes in the dates of access to the 2 GHz MSS bands at WRC-95 and the concurrence in a gradual transition approach, COMSAT proposes the following adjustments and clarifications to its plan, which are depicted in Chart A attached hereto.

First, the FCC should, consistent with WRC-95, issue an Order which allocates the 1990-2025 MHz band for MSS uplinks and the 2160-2200 MHz band for MSS downlinks commencing in year 2000. By allocating the full 75 MHz of spectrum for MSS uplinks and downlinks, all of this spectrum would be available for MSS applicants in one application round, thereby increasing the MSS applicants' options for avoiding mutual exclusivity -- and auctions -- in the assignment of licenses for the 2 GHz band.[25]

Second, to ensure that these bands are usable by MSS the FCC should immediately impose a freeze on new BAS licenses in the 1990-2025 MHz band and on new terrestrial FS licenses in the 2160-2200 MHz band. By imposing such a freeze the FCC would limit the number of BAS and FS licensees that occupy the band and which would need either to move (in the case of BAS), or to coordinate with MSS to share the band (in the case of FS systems) for a substantial period. Indeed, we note that the FCC has already imposed a freeze on new FS operations on a primary basis in the 2180-2200 MHz band as part of its efforts to clear spectrum at 2 GHz for terrestrial personal communications systems in the United States.[26]

Third, to provide for the gradual transition of existing facilities from the portions of the 2 GHz band which overlap with

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[25] COMSAT, and indeed the entire MSS industry, has previously expressed its opposition to the use of auctions to award MSS licenses. See COMSAT Comments at 24-32; COMSAT Reply at 20-22.

[26] See 47 C.F.R. § 94.61(b).

MSS, we propose that the FCC restrict existing BAS and FS license renewals for the 2 GHz MSS bands in several ways. In the MSS uplink, the BAS operators now occupying the 1990-2008 MHz band (BAS channel 1) would need to vacate this band by the year 2000 based on either a rechannelization of the BAS band as described in COMSAT's Comments,[27] or the movement of the BAS operators to a different frequency band.[28] Thus, any BAS operators with license expirations before the year 2000 would receive a renewal that would permit operations in the 1990-2008 MHz band only until the year 2000. Any BAS licenses for this band which expire after year 2000 would receive prior notification that they must cease operations as of January 1, 2000.[29]

After January 1, 2000, BAS operations in the 2008-2025 MHz band (BAS channel 2) would become secondary to MSS uplinks and

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[27] COMSAT Comments at 19-20. We note that at least one broadcast group has suggested that it would be possible to narrow the bandwidth of the BAS channels to clear up to 14 MHz of spectrum for MSS. See Comments of the Society of Broadcast Engineers at 8.

[28] The specific method and terms for clearing the BAS bands at 1990-2025 MHz band will depend to a certain extent on the outcome of the current debate in Congress on digital broadcast spectrum issues. However, we suggest that the FCC may, at the very least, put the broadcasters on notice that BAS operations will no longer retain their primary status in the 1990-2025 MHz band after January 1, 2000. Such notice is consistent with the FCC's proposed Footnote NG156 to the U.S. Table of Allocations as proposed in Appendix A of the NPRM.

[29] While we do not believe that there are any troposcatter FS systems operating in the MSS uplink bands in the United States, we note that the WRC-95 Final Acts specify that existing FS troposcatter systems are to be phased out by January 1, 2000 and new troposcatter systems are not to be brought into operation in these bands. See WRC-95 Final Acts (Part II), Res. COM 5-10, Resolves 4.2.

would be required to accommodate any MSS systems proposing to operate in this band before the year 2005. It is expected that BAS operators would vacate the band by the year 2005 through the transition to digital technology and/or the relocation of BAS to other bands.[30] However, as of January 1, 2005, BAS operations in this band would cease.

As we indicated in our Comments, it is vitally important to clear BAS operations from the 2 GHz bands before MSS systems become operational because MSS systems cannot share the uplink band at 1990-2025 MHz with BAS.[31] In fact, BAS uplinks from stations operating in the United States may cause interference to any MSS satellite, whether it is licensed by the FCC, or by authorities in other countries, and to any communications traffic over the satellite whether the traffic touches the United States or not.[32] Consistent with the results of WRC-95, the Commission must address this situation so that MSS systems operating worldwide can commence operations on January 1, 2000, free from the potential for unacceptable interference from BAS operations in the United States.

In the MSS downlink, existing FS licensees operating on a primary basis in the 2160-2200 MHz band would be required to

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[30] COMSAT Comments at 22-23; COMSAT Reply at 10-17.

[31] COMSAT Comments at 8-10.

[32] Any MSS system with receive operations in the 1990-2025 MHz band will be impacted when its satellites move within the field of view of one, or more, of the BAS transmission paths having sufficient signal level at the satellite to cause unacceptable interference.

coordinate sharing and transition arrangements with MSS applicants proposing to use this band, or a specific segment of the band, between years 2000-2005, consistent with the results of WRC-95 and the coordination method set forth below. As existing FS licenses expire before the year 2005, FS operators would either relocate to bands not overlapping with MSS or be granted a short renewal to permit operations in those bands only until the year 2005. We would expect, for example, that stations with equipment older than ten years would relocate operations, and not attempt to renew existing FS licenses for a full ten year term or to invest in new equipment in the overlapping MSS bands.[33] As of January 1, 2005, all existing FS operations in the 2160-2200 MHz MSS bands would cease.

Under COMSAT's proposal, existing FS microwave operators could have up to nine more years to transition their operations out of the 2 GHz bands overlapping with MSS. The gradual transition should ensure that the vast majority of FS equipment

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[33] COMSAT believes that much of the equipment in the private operational fixed ("POF") band at 2180-2200 MHz has been in operation for many years and at a minimum was installed more than 5 years ago. Accordingly, many of these facilities may be close to full amortization and, thus, in a position to move before year 2005. In the common carrier band at 2160-2180 MHz, in which installations have been growing in recent years, the pay back period for these facilities is believed to be much quicker than for POF installations. Also, there are likely to be strong incentives for cellular operators in the 2160-2180 MHz band to replace 2 GHz installations with fiber and wideband copper on higher density routes. See, e.g., NTIA, U.S. Dep't of Commerce, Pub. No. 94-31, U.S. National Spectrum Requirements: Projections and Trends 73-76 (1995). For these reasons, the common carrier installations at 2160-2180 MHz may also be in a position to relocate earlier than year 2005.

is substantially amortized prior to being replaced and that FS operators have sufficient time to plan for new installations in a different frequency band. Moreover, given the length of the transition period, there would be no need for MSS to reimburse FS operators for their expenses associated with the gradual transfer to new FS installations outside the 2 GHz MSS bands.

C. Specific MSS/FS Coordination Criteria Should be Adopted and Technical Discussions Continued to Implement the Transition Arrangements

To facilitate sharing in the MSS 2 GHz downlink band, the FCC must validate the industry agreed criteria to evaluate the maximum acceptable levels of interference for FS operations in the 2160-2200 MHz band consistent with the procedures set forth in the WRC-95 Final Acts and the applicable ITU-R Resolutions and Recommendations on FS minimum performance objectives. COMSAT has prepared two flow charts to describe the specific steps to be followed to coordinate MSS downlinks into existing FS receive stations. Chart B describes the steps to be followed in coordinating digital FS stations, while Chart C describes the process for coordinating analog FS stations.

As depicted in the attached flow charts, the coordination process entails essentially three steps: (1) the parties must first make a preliminary evaluation as to whether fractional degradation in performance ("fdp") or threshold power flux density ("pfd") levels are exceeded for the digital and analog FS stations, respectively; (2) if the threshold is exceeded, then the parties would perform further calculations to demonstrate

that unacceptable interference does not result to the FS station; and (3) if the FS system is potentially subject to unacceptable interference then the MSS and FS interests would negotiate steps to mitigate and resolve the interference.

Resolution of MSS/FS conflicts could take a number of forms. For example, if the MSS interference was deemed to be at an acceptable level during periods when the FS path was unfaded, but unacceptable during periods of deep fades, the situation could be handled by using a diversity path for the FS system. Typically, this would entail use of a second pair of antennas at each microwave tower, separated spatially to guarantee that fades on the two paths would not be statistically correlated.

In other MSS/FS conflict situations, operational solutions could be indicated that would avoid additional expense for the FS operator, but would entail imposing certain constraints on the MSS operator. Thus, in the event of potentially unacceptable or harmful interference, the MSS operator could review the distribution of RF carriers planned on the transponder/satellite beams affecting the FS stations and attempt to alter the carrier traffic plans so that the FS link performance could then meet the ITU-R performance objectives. This effort would require a trial and error re-running of the simulation software[34] in order to test whether each, or any, of the MSS operational solutions

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[34] Several entities, including COMSAT LABS, have been developing software which could be used for detailed coordination and testing.

proposed would actually result in favorable FS performance.[35]

To further develop the coordination methodologies, the FCC should encourage MSS and FS representatives to continue their technical discussions on possible sharing and transition arrangements in the 2 GHz bands and to explore ways to implement the results of WRC-95 and the relevant ITU-R Recommendations. The FCC should consider setting a time schedule with guidelines and objectives for the FS and MSS industries to agree by year end 1996 on the technical basis necessary to implement COMSAT's proposed coordination methodologies and should articulate a plan to incorporate these discussions into this proceeding.

IV. A GRADUAL TRANSITION WILL ENSURE THAT THE PUBLIC INTEREST BENEFITS OF 2 GHZ MSS ARE REALIZED

As a leader in satellite communications technology and the country responsible for proposing the 2 GHz MSS allocations at WARC-92, it is critical that the United States set an example for the world by implementing the gradual transition arrangements provided for in the WRC-95 Final Acts. The Final Acts reflect not only the cooperative efforts of the countries at the Conference to reach agreement, but also the hopes and expectations that a gradual transition will prove successful in

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[35] If during the MSS initial operation period, despite the use of reasonable MSS/FS coordination criteria and the methodologies suggested herein, it becomes necessary to construct a diversity path or even to relocate discrete installations to other frequency bands to resolve specific cases of harmful interference, COMSAT would agree to enter into negotiations with the affected FS licensee regarding the terms governing that corrective action.